

THE INFLUENCE OF THE BASIC-MOTOR POTENTIAL ON THE ACCURACY OF REJECTION AND PASSING THE BALL BY FINGERS IN VOLLEYBALL

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Abstract

The main objective of this study was to determine the influence of basic-motor potential treated as a predictor of the (independent) system variables on the situational-motor abilities of volleyball players, as a criteria (dependent) variables. Modern volleyball more and more shows important binding with science, which opens up new ways and new perspective for training volleyball players (Ivanović et al., 2010). This research was conducted on a sample of 75 respondents, who competed in the First Volleyball League of Montenegro, chosen from first five teams, namely: "Buducnost" - Podgorica, "Moraca" - Podgorica, "Rudar" - Pljevlja, "Galeb" - Bar, and "Luka" - Bar. To estimate the basic motor skills sub-spaces were chosen which are considered primary in the implementation of complex motion structures which are abundant in volleyball game, and also tests were presented that determine: coordination, speed, explosive strength, repetitive strength and flexibility of female volleyball players with a total of fifteen (15) variables, while situational motor is presented with five hypothetical factors, and those are: 1. the accuracy of rejection and passing the ball with fingers; 2. the accuracy of the rejection and passing the ball with the forearms; 3. precision of serving; 4. the accuracy of the spike; 5. the power of rejecting and hitting the ball, and this space was presented by eleven (11) variables. The results obtained by testing within the studied area were analyzed by statistical package STATISTICA and SPSS, and subjected to the following statistical operations and procedures. Regression analysis was used within the multivariate level to determine the magnitude of the effects of the predictor system or basic motor abilities on the criterion system which was presented by situational-motor abilities of female volleyball players. Data obtained in this study point out the fact that there is a statistically significant impact of basic-motor potential to the situational-motor abilities of female volleyball players.

Key words: basic motor skills, specific motor, female volleyball players, influence

Introduction

The sport system in the world is experiencing continuous deep qualitative, quantitative and structural transformations, which stem from the recent social, economic, political and technological conditions of the society development (Malacko and Radja, 2004). The physical development and improvement of motor skills are important components that can be affected by programmed physical exercise or training (Bompa, 2005).

Sport has a long tradition and a bigger and bigger socio-economic importance, so it is logical that there were many interested individuals who attempted to carry out a systematization of sporting disciplines, which are growing in number, parallel with the development of human society. Games and especially sports games which includes a large number of players that are simultaneously confronted in constant motion at individual, group and collective level, is a unique phenomenon that is not easy to analyze (Rogulj, 2000). Volleyball is a collective game that puts players in front of numerous requests which, among others, belong to the area of intellectual abilities. Modern volleyball game requires for all players to have a high level of general and specific motor skills that are important for a volleyball game, for the players' positions on the field. Players must be prepared to perform all technical/tactical elements efficiently as possible.

In the last hundred years, volleyball has come a tremendous way of development and become one of the most dynamic sports games with enough complex rules. In particular way, it shapes human life and movement. Modern volleyball shows more and more important binding with science, which opens up new ways and new perspective for training volleyball players (Ivanovic, Dopsaj, Nestic and Stankovic, 2010). Modern volleyball game requires from all players a high level of general motor skills, as well as specific - characteristic for volleyball game and for certain playing positions (Martinovic, Dopsaj, Kotur-Stevuljević, Dopsaj, M., Vujovic, Stefanovic and Nestic, 2011). Players must be prepared to perform perfectly every technical-tactical element. By respecting gradualism and method during the training process, it is necessary to find adequate "shortcut" from beginners volleyball players to volleyball players that owns a series of volleyball knowledge and skills which can effectively be manipulated with (Jurko, Nestic and Stojanovic, 2013).

Methods

This research was conducted on a sample of 75 female respondents, who competed in the First Volleyball League of Montenegro, and they were chosen first five teams, namely: OK "Future" -

Podgorica, OK "Moraca" - Podgorica, OK, "Miner" - Pljevlja OK "Seagull" - Bar, and OK "Luka" - Bar. To estimate the basic motor skills sub-spaces were selected which are considered primary in the implementation of complex motion structures which are abundant in volleyball game, and also tests were presented to determine: coordination, speed, explosive strength, repetitive strength and flexibility of volleyball players with a total of fifteen (15) variables, while situational motor skills are presented with five hypothetical factors: 1. the precision of rejection and a passing the ball with fingers; 2. the precision of the rejection and passing the ball with the forearms; 3. precision of serving; 4. the precision of the spike; 5. the power of rejection and hitting the ball, and this space was presented with eleven (11) variables. Regression analysis was used within the multivariate level to determine the magnitude of the effects of the predictor system or basic motor abilities on the criterion system that was presented by situational-motor abilities of volleyball players. The main objective of this study was to determine the influence of basic-motor potential, treated as the predictor (independent) variables of the system, on the situational-motor abilities of volleyball players that are treated as criterion (dependent) variables.

Results

After examining the results obtained by regression analysis of basic motor skills and hypothetical factors of the precision of rejection and passing the ball with fingers (PPR) the size of the general impact of the predictor variables represented by space basic was determined - motor abilities on two variables from space situational - motor abilities which are defined as: rejection of the ball in a cyclic manner on the wall with fingers (SOPKNZ) and elevation precision of ball from the basic standpoint by fingers (SOPEOS) as criterion variables. In addition, with this method we determined the influence of each predictor variable on the given criteria. Regression analysis of the basic-motor abilities and rejecting the ball in a cyclic manner on the wall with fingers. Regression analysis of these sets (Table 1) had demonstrated statistically significant correlation between the basic-motor abilities as predictor system and rejecting the ball in a cyclic manner on the wall with fingers, as the criterion variable. Multiple correlation coefficient is relatively high with 68% (P = .675), with a total explained variability of about 46% (R Square = .456) in a statistically strictest level of Sig. = .00. We conclude that the studied variables of basic-motor skills in the work are involved in the prediction of rejecting the ball in a cyclic manner on the wall by fingers with 46% share, while the remain variance of 54% belongs to all the other anthropological dimensions and other factors, which were not treated in this study . Partial influence of individual variables of basic - motor abilities on rejecting the ball in a cyclic manner on the wall by fingers was selected with five variables with statistical significance. The highest predictive value was exhibited by all treated variables of flexibility,

and those are: bend on the bench (MFLPRK), bend astride (MFLPRR) and side split (MFLBOS) as well as the variables of explosive strength of lower limbs horizontal components: long jump from the standing point (MFESDM) and triple jump from the standing point (MFETRO). For isolated predictive function, tests responsible for the mechanisms of regulating tonus and quality of connective tissue have the dominant role as well as mechanisms for regulating excitation intensity.

Table 1 Regression analysis – Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,675	,456	,317	19,280

Since the entire system of investigated basic motor abilities have a statistically significant correlation (sig. = .00) with criteria variable of elevation precision of rejecting the ball from the basic standpoint by fingers (SOPEOS, we can continue with the analysis of general and individual impact of predictor measures on the criterion (Table 2).

Table 2 Regression analysis – ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
1. Regression	18371,06	15	1224,74	3,295	,001
Residual	21932,08	59			
Total	40303,15	74			

Table 3 Regression analysis - Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Constant	77,90	97,21		,80	,43
MBFTAN	1,86	1,28	,19	1,47	,15
MBFTAZ	,37	,83	,05	,45	,66
MFE20V	23,65	15,49	,21	1,53	,13
MFLPRR	1,12	,32	,64	3,82	,00
MFLPRK	-1,36	,52	-,42	-2,61	,01
MFLBOS	-,47	,16	-,36	-2,90	,01
MFESDM	,46	,17	,43	2,69	,01
MFESVM	-1,12	,62	-,28	-1,81	,08
MFETRO	-13,17	6,32	-,32	-2,08	,04
MFEBML	-,04	2,02	-,00	,02	,99
MRSPT30S	-,53	,93	-,08	-,57	,57
MRESKL	-,68	,58	-,16	-1,17	,25
MKLSRL	-2,80	1,62	-,25	-1,73	,09
MAGKUS	-4,22	2,58	-,19	-1,64	,11
MKTOUZ	3,17	4,49	,09	,71	,48

(B – non-standardized BETA coefficient; Std. Error - standard error; Beta - beta coefficient; t - the value of t - test; Sig - level of significance of Beta coefficient and t – test)

Multiple correlation coefficient is 0.631 (R), while the size of the general impact of mediocre is 0398 (R Square). Based on the size of the given parameters, we see that the entire system of studied variables of basic - motor abilities has a 40% impact on the elevation precision of rejecting the ball from the basic standpoint by fingers while the remaining 60% belongs to the influence of other endogenous and exogenous factors that were not studied in this paper.

The individual impact of predictor variables on the criterion variable is achieved, as in the previous analysis, by the variables of flexibility: bend on the bench (MFLPRK) and side split (MFLBOS), two variables of repetitive strength: raising body in 30 seconds (MRSPT30S) and push-ups from hands and knees resistance (MRESKSL) and one variable of explosive power which is presented by throwing a medicine ball while lying on your back (MFEBML).

We can say that here female volleyball players with the prevailing mechanisms for regulating the intensity and duration of excitation in the areas of central nervous system with a touch of quality of connective tissue have dominated.

Table 4 Regression analysis – Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,631	,398	,245	4,934

The facts in this sample of volleyball players can be helpful in making the prediction of the impact of the studied variables of basic - motor abilities on the criterion variable of precision of rejection and passing the ball by fingers, so that we can conclude that there is a statistically significant impact of basic-motor potential on the precision of rejection and passing the ball by fingers.

Table 5 Regression analysis – ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
1. Regression	18371,06	15	1224,74	3,29	,001
Residual	21932,08	59	371,73	5	
Total	40303,15	74			

Discussion and conclusion

The population from which the sample of respondents is selected is defined as a population of top female volleyball players who competed in the First Volleyball League of Montenegro, and first five teams was chosen to reach the best possible results. This research was conducted on a sample of 75 respondents, senior female volleyball players, namely: OK "Future" - Podgorica, OK "Moraca" - Podgorica, OK, "Miner" - Pljevlja, OK "Seagull" - Bar, and OK "Luka" - Bar. Statistical procedures for the entry and processing of data in this study were selected so that can provide following information in an objective manner:•Information on the distribution of manifest variables.•Information on central and dispersion parameters.•Information on the connection between basic - motor and situational - motor abilities. • Information on the impact of basic motor skills on situational readiness of volleyball player. Looking at structuring factors of the first canonical pair of basic motor and situational-motor abilities of female volleyball players, and knowing the structure of the game of volleyball, we can say that the first canonical pair is constructed of dominant abilities within the both framework of space.

Table 6 Regression analysis - Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Constant	9,50	24,88		,38	,70
MBFTAN	,36	,33	,15	1,11	,27
MBFTAZ	,32	,21	,19	1,52	,13
MFE20V	-5,25	3,96	-,20	-1,33	,19
MFLPRR	-,18	,08	-,38	-2,19	,03
MFLPRK	,05	,13	-,06	,36	,72
MFLBOS	,10	,04	-,32	2,43	,02
MFESDM	-,04	,04	-,17	-,99	,33
MFESVM	-,24	,16	-,24	-1,49	,14
MFETRO	-1,43	1,61	-,14	-,88	,38
MFEBML	1,69	,52	,39	3,24	,00
MRSPT30S	-57	,24	,34	2,37	,02
MRESKSL	,36	,15	,34	2,39	,02
MKLSRL	,33	,41	,12	,79	,43
MAGKUS	,79	,66	,14	1,19	,24
MKTOUZ	-1,85	1,15	-,21	-1,61	,11

This are female volleyball players with enviable speed of moving and movement, with the domination of the explosive force and distinct coordination which are the basis for the realization of complex situational conditions, which support the situational elements of spike power and hitting the ball, and make contemporary volleyball player ready for requirements of modern volleyball.

A significant contribution to the variance of the first canonical pair of space situational-motor abilities is provided by manifest variables of elevation precision of rejecting the ball from the basic standpoint by fingers and elevation precision of rejecting the ball by forearms which belong to the hypothetical factor of Precision of rejection and passing the ball by fingers (PPR).

The second canonical pair in the space of situational-motor skills is structured as a primary factor of rejecting the ball by fingers in a cyclic manner on the wall and rejecting the ball by forearms against the wall with a certain proportion of the precision of rejecting ball by forearms inside the circle. Regression analysis between basic motor skills, as the predictor system, and rejecting the ball in the circle on the wall by fingers, as the criterion variable multiple correlation coefficient is relatively high 68% (P = .675), with a total explained variability of about 46% (R Square = .456) in a statistically strictest level of Sig. = .00. Partial influence of individual variables of basic motor skills on rejecting the ball into the circle on the wall by fingers was selected with five variables with statistical significance.

The entire system of investigated basic motor abilities have a statistically significant correlation (sig. = .00) with criteria variable of elevation precision of the ball from the basic standpoint by fingers and multiple correlation coefficient equal to 0.631 (R), while the size of the general impact of mediocre is 0398 (R Square).

Ćudić et al. (2010) conducted a survey in a sample of 93 respondents from volleyball population aged 15-16 years in order to determine the influence of basic motor variables on situational precision necessary for the success of volleyball game.

The results showed a statistically significant effect of the predictor on two variable criteria, namely the elevation precision of rejecting the ball by forearms from the basic standpoint and precision in tactical serving, while for the variable of precision of rejecting the ball by fingers in a circle on the wall, there was no statistically significant effect of predictor system. (Džibrić, Ferhatbegović and Ganić, 2011) for the aim of their research had defined mutual relations and influence of basic motor skills as predictors of the situational motor

skills as a criteria, in a sample of 112 boys aged 13-15 years were the system of 20 variables was applied. Based on the results obtained by using canonical correlation analysis we can conclude that the relation between the observed groups of variables of motor skills (as a predictor set of variables) with the criterion set of variables (situational-motor skills) will form a significant coefficient of canonical correlation. Practical significance of this study, based on obtained data can be viewed through the possibility of dosing and distribution of training operators, allowing a more objective and comprehensive manner of selection and proper and timely guidance for young athletes towards the role in a game which is dominated by a certain latent mechanisms that will contribute to effective event in terms of result.

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UTJECAJ BAZIČNO-MOTORIČKOG POTENCIJALA NA PRECIZNOST ODBIJANJA I DODAVANJA LOPTE PRSTIMA U ODBOJCI

Sažetak

Temeljni cilj ovog istraživanja je utvrđivanje utjecaja bazično-motoričkog potencijala (prediktorski nezavisni sustav varijabli), na situacijsko-motoričke sposobnosti odbojkašica (kriterijske zavisne varijable). Suvremena odbojka pokazuje sve više i značajnije vezivanje za znanost, koja otvara nove puteve i nova gledanja na trening odbojkaša (Ivanović i sur., 2010). Ovo istraživanje je provedeno na uzorku od 75 ispitanica, koje se natječu u Prvoj odbojkaškoj ligi Crne Gore. Odabrano je pet prvoplasiranih ekipa, a to su : OK "Budućnost"- Podgorica, OK "Morača"- Podgorica, OK "Rudar"- Pljevlja, OK "Galeb"- Bar, i OK "Luka"- Bar. Za procjenu bazično-motoričkih sposobnosti odabrani su subprostori koji se smatraju primarnim u realizaciji složenih kretnih struktura kojima obiluje odbojkaška igra, a predstavljeni su testovima koji utvrđuju: koordinaciju, brzinu, eksplozivnu snagu, repetitivnu snagu i fleksibilnost odbojkašica sa ukupno petnaest (15) varijabli, dok je situacijska motorika predstavljena sa pet hipotetskih faktora i to: 1. preciznost odbijanja i dodavanja lopte prstima; 2. preciznost odbijanja i dodavanja lopte podlakticama; 3. preciznost serviranja; 4. preciznost smeča; 5. snaga odbijanja i udaraca po lopti. Ovaj prostor predstavljen je sa jedanaest (11) varijabli. Rezultati dobiveni testiranjima u okviru istraživanih prostora obrađeni su statističkim paketima STATISTICA i SPSS, te podvrgnuti odgovarajućim statističkim operacijama i procedurama. Regresijska analiza je primijenjena u okviru multivarijatne razine s ciljem utvrđivanja veličine utjecaja prediktorskog sustava, odnosno bazično-motoričkih sposobnosti na kriterijski sustav koji je predstavljen situacijsko-motoričkim sposobnostima odbojkašica. Podaci dobiveni ovim istraživanjem nam ukazuju na to da postoji statistički značajan utjecaj bazično-motoričkog potencijala na situacijsko-motoričke sposobnosti odbojkašica.

Ključne riječi: bazična motorika, specifična motorika, odbojkašice, utjecaj

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